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EFFICACY OF ALUMINUM PHOSPHIDE FOR CONTROLLING NORTHERN POCKET GOPHERS

by

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ABSTRACT

Aluminum phosphide fumigant pellets were manually applied to 20 active pocket gopher burrow systems on a site in Fergus County, Montana, on November 8-9, 1984. Post-treatment census indicated that the fumigant was 80 percent effective in reducing pocket gopher activity. Cost of toxicant and application time were $25.20 and 7 hours, respectively.

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INTRODUCTION

The Northern Pocket gopher (Thomomys talpoides) is a widely distributed burrowing rodent found in much of the western U.S. and southern Canada. In Montana, this pocket gopher is found throughout the state in nearly all habitat types. In the natural environment, the activities of the rodent may be mostly beneficial. Burrowing activities aid in soil mixing and allow air and water infiltration. Their presence increases plant and animal diversity. Gophers are a prey item for many predators. However, in cultivated and agricultural areas, the activities of the northern pocket gopher are considered detrimental and they are regarded as a serious agricultural pest. Burrowing activity may cause soil erosion and irrigation wash outs. Root damage to row crops, pasture, alfalfa, clover, and other large rooted plants can cause significant reduction in yields. The mounds of soil deposited on the ground surface exclude crop vegetation, provide beds for weed invasion, and may seriously damage harvesting equipment.

Traditional methods of controlling pocket gophers consist of toxic grain baits placed manually in the burrow systems or used in mechanical burrow building machines and trapping. Burrow fumigation using ignitible gas cartridges has given inconsistent and poor results. Recently, another fumigant, aluminum phosphide, has been registered for controlling burrowing rodents. Although this pesticide has been very successful in controlling black-tailed prairie dogs (Cynomys Ludovicianus), (Sullins, unpub. data; Sullivan, pers. comm.)

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yellow -bellied marmots (Marmota flaviventris), (Sullins, unpub. data) and Columbian ground squirrels (Spermophilus columbianus) (Garner, unpub. data; French, 1984) in Montana, it has not been locally field tested for pocket gopher control.

The purpose of this project was to determine the efficacy and cost of applying aluminum phosphide for controlling northern pocket gophers.

We are most grateful to Research Products Company for supplying the fumigant (Detia Rotox AP) and to Ward Burleigh, rancher, who permitted the use of his property to conduct the project.

STUDY AREA

The study area was established approximately 4 miles southeast of Lewistown, Montana. The area consists of rolling hills interspersed with timber, range, and agricultural lands. Primary agricultural crops are alfalfa, pasture, and small grains. The study site was located on an alfalfa field near Big Spring Creek. Pocket gopher populations in the area are classed as moderate to heavy (10 to 20+ gophers per acre).

METHODS AND MATERIALS

A plugged hole census was used to determine active pocket gopher burrow systems. Pocket gopher tunnels were opened at freshly dug mounds in separate burrow systems. The opened burrows were marked

with flags and rechecked after two days for plugging. Those opened tunnels that were replugged were considered to have active pocket gophers while those that were left unplugged were considered not active. Twenty active burrow systems were marked and fumigated. Each active burrow system was treated in three locations at freshly dug mounds (excluding the census mound). At each treatment mound, the tunnel was located by probing and all loose dirt was removed from the tunnel system. Twenty fumigant pellets (a total of 60 pellets per burrow system) were placed in each treatment tunnel using a long handled bait dipper. If the tunnel branched at the treatment site, 10 pellets were placed in each branch of the tunnel; otherwise, all 20 pellets were placed in the single tunnel. The treatment tunnels were then carefully plugged with sod and covered with tamped soil. After a three day period, the census holes were reopened. Evidence of replugging of the opened tunnels was checked after an additional two day period. Pocket gophers were considered dead by fumigation in those burrow systems remaining open. Fumigation was considered unsuccessful in the replugged tunnels. Cost of the fumigant and time of application were also recorded.

RESULTS AND DISCUSSION

Five days after the fumigation of 20 active pocket gopher burrow systems, 16 burrow systems (80%) remained open and were considered successfully fumigated. Four burrow systems (20%) were replugged indicating that fumigation was unsuccessful. These results were considered to give fair control that is equal to or exceeds most existing pocket gopher control methods.

Surface soil moisture on the test site was good because of recent precipitation. However, it was still below normal since unusual drought conditions have persisted in the area over the past year. The fumigant may have been more effective with higher soil moisture.

Although the amount of toxicant per treatment site recommended on the product label was used in this project, it is still unclear how many treatment sites per burrow system are needed. Varying from the three treatment sites per burrow system used in this study may significantly affect the results. The larger tablet (Detia Rotox AT) formulation of this fumigant was not tested in this study so a comparison to the pellets is not presently available.

Major disadvantages of the tested fumigant were time and cost of application. It required 7 hours of labor to open, treat, and close the 60 treatment sites located in the 20 burrow systems of this study. The cost of the toxicant for the study was $25.20 ($1.26 per burrow system). Such labor and cost may restrict the use of the fumigant to small acreages, sparce populations, or perhaps to a clean-up method following another control method. If less fumigant could be applied without adversely affecting efficacy, cost and labor would be significantly reduced. A faster application method that does not require the opening and removal of soil from the tunnel systems would greatly reduce application time. Probing for pocket gopher tunnels and placing the fumigant through the probe hole similar to hand baiting with grain baits is a possibility. However, it is often difficult in some soil types to know if the probe is actually entering

the tunnel. Further testing under different environmental conditions and using varying application rates and techniques may be needed to reduce cost and labor and increase efficacy.

Another major disadvantage of aluminum phosphide is that it is not presently registered for use on croplands. This greatly restricts its use in agricultural areas for rodent control.

LITERATURE CITED

French, Roxa A. 1984. Alternatives to 1080 Control of Columbian ground squirrels. Montana Vertebrate News. Montana Department of Agriculture, Helena, MT 59620.